# Mechanical Engineering:

# Index of 2001 Articles

January


February

## FEATURE ARTICLES BY AUTHOR

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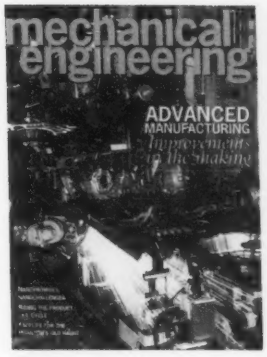

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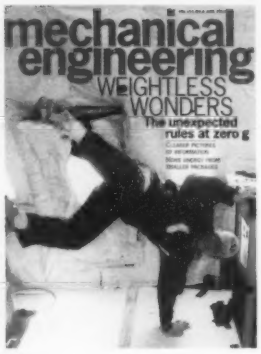
## Feature Articles by Title

May




June

**A Frontier for Engineering** The aim of nanotechnology is to build the future molecule by molecule. Mihail C. Roco, January, pages 52-55.

**A Practical Tool** A software marketer makes a business case for CFD in the competitive electric power industry. Eric Bish, July, pages 73-74.

**A Tale of Two Buses** What do end users need to know to reap the benefits of digital fieldbus architecture in process control? John DeGaspari, September, pages 51-55.

**Advanced Nasal Operations** Simulation technology that trains fighter pilots also reduces the risks for surgeons and patients. Jack Raplee, February, pages 56-58.

**Basic Drives** Imagine an economy in which energy is taken from a range of sources and delivered in only a couple of convenient forms. These people do. Harry Hutchinson, December, pages 51-55.

**Beating the Cold** An onboard fuel-distilling system aims to curb the belch of hydrocarbons from a cool starting engine. Harry Hutchinson, April, pages 74-75.

**Beyond PDM** As technology changes, so does the definition, and capabilities, of product data management. Jean Thilmany, March, pages 66-68.

**Blackout Punch** A California landscaper discovers an unorthodox solution to rolling blackouts, using remote power generation. Jack Raplee, August, pages 68-69.

**But Will It Hold Water?** It was prime real estate, with a million-gallon tank overhead; engineers were asked to determine the risk. Mechanical Engineering Staff, March, pages 70-71.

**Cell Culture** Redesigning a plant along a cellular manufacturing concept helped to turn around a troubled company. John DeGaspari, March, pages 56-59.

**Coming to a MEMS Near You** A new technology makes the micro components of diamond film. Jean Thilmany, February, page 63.

**Cooling Solution** Virtual prototyping shaves time off the development of a small electric motor. Mechanical Engineering Staff, November, page 73.

**Detroit, We Are Here** Automakers are using French-born manufacturing software to improve the machining and assembly of their vehicles. Michael Valenti, March, pages 50-55.

**Drip, Drip, Drip** Water is returning as an alternative to oil in hydraulic systems, but it takes more work than simply turning on your tap. Peggy Chalmers, May, pages 63-65.

**Electronic Spelunkers** Manufacturers might choose shared access to virtual-reality technologies. Jean Thilmany, June, pages 74-77.

**Engineering Art** Water fountains combine fluid handling, motion control, and human imagination to let a precious resource reveal its whimsical side. Said Shakerin, July, pages 66-69.

**Engineers for an Icon** The restoration of Radio City Music Hall returns a landmark to its original glory—with a number of updates. Ellen Lampert-Greaux, September, pages 56-59.

**Expert Built-In** New analysis software packages take much of the guesswork out of simple computer simulations. Jean Thilmany, October, pages 70-72.

**FEA in a Snap** A toolmaker finds that finite element analysis isn't the beast it once was. Jean Thilmany, July, pages 60-62.

**Filling In the Blanks** A simulation early in the design cycle becomes more useful as it picks up more detail. Vijay Damodaran and Shailen Kaushik, September, pages 70-71.

**Fresh Air, Wide-Open Space** Researchers are developing a new vision of flight, a future of ever-safer, more efficient vehicles and system controls. Daniel S. Goldin et al., November, pages 48-55.

**From Helios to Our House** Looking at fan blades aerodynamically leads to higher-efficiency cooling. Paul Sharke, August, pages 42-46.

**Garden State Green** New Jersey offers cash to back energy conservation and renewables. Harry Hutchinson, July, page 75.

**Gears From Scratch** Plastic brings novelty to design and challenges to manufacturing. Paul Sharke, December, pages 40-43.

**Going Global** A manufacturer unifies dispersed international facilities with online collaboration. Mechanical Engineering Staff, February, pages 60-62.

**Heat Out of Small Packages** Compact cooling devices are taking shape to deal with the next generation of ever-hotter computer chips. Yogendra Joshi, December, pages 56-58.

**Hell on Wheels** Sensors tell of heat and strain, but the trick lies in getting the whole story while it is still spinning. Larry Rogers and John Reschovsky, January, pages 69-71.

**High-Tech Healing** Engineering technology meets medicine in customized vascular surgery. Jean Thilmany, January, pages 62-65.

**Hybrid NEMS** Inching—er, nanometering—toward mechanical devices of an atomic scale, two researchers spell out practical considerations for MEs who will one day design them. Paul Sharke, February, pages 42-45.

**Information Interface** Developments in communication software promise a robust future for engineering technology. Jean Thilmany, April, pages 62-64.

**It's All About Togetherness** No matter what it's called, a product-data management system passes engineering information across a network. Jean Thilmany, August, pages 64-67.

**Keener Eyes for Beowulf** Maintaining the country's nuclear weapons—without a shot being fired—requires flexible computer power and ever-expanding images of data. Mechanical Engineering Staff, June, pages 78-79.

**Keeping It Cool** More air in, more power out: Air cooling gives gas turbines a boost. Michael Valenti, August, pages 48-52.

**Keeping the Flow in Nuclear Plants** A monitoring system prototype uses radio-frequency tags to communicate performance data in nuclear power plant systems. John DeGaspari, May, pages 66-68.

**Let Light Be There** Brighter automotive beams, though they pierce the dark, can rob other drivers of night vision. Lighting experts see the problem from both sides. Paul Sharke, June, pages 70-73.

**Light for the Future** Forecasts see a brighter age in which electric power reaches farther and does more. Exactly how that will happen remains an open research question. Harry Hutchinson, October, pages 60-65.

**Like a Cold Knife Through Anything** Abrasives in a fine jet of water cut precision parts smoothly and swiftly without generating heat. Michael Valenti, May, pages 48-53.

**Little Big El-Mo** The promise of super-efficient motors spins closer to its realization. Paul Sharke, October, pages 52-55.

**Maintaining Focus** Routine fixes and servicing are receiving greater emphasis in the design of the latest fighter aircraft. Mechanical Engineering Staff, October, pages 76-78.

**Making Full Speed** Remanufacturing gives an old vessel a new mission. Mechanical Engineering Staff, December, pages 62-63.

**Making Sense** We often take touch for granted. Adding it to computers turns out to be the classic mathematics application. Paul Sharke, January, pages 44-46.

**Making the Cut** An electrochemical process that shapes complex turbine parts is shopping for more jobs to take on. Michael Valenti, November, pages 64-67.

**Micro Resolution** A project to reduce inkjet printheads to the MEMS scale calls for a detailed profile of the ink. Mechanical Engineering Staff, July, pages 70-72.

**More Motor Muscle** Material and design improvements convert more electrical energy into mechanical power. Michael Valenti. October, pages 56-59.

**Necessary Tools** Advocates say that the future of engineering can't happen without advanced computing technologies. Jean Thilmany, November, pages 60-62.

**New Avenues for Electrochemistry** Fuel cell systems are being designed for service at coal mines, private homes, and tomorrow's battlefields. Michael Valenti, February, pages 46-51.

**No Hunting** What could be simpler than a wheel rolling along a rail? Plenty. Paul Sharke, May, pages 54-57.

**Not Without Engineering** Experience is new at the nanoscale, but turning discoveries into technology will still be done the traditional way. Arun Majumdar, March, pages 46-49.

**Packaged for the Road** Fans of metal composites say they're lightweight and they can take the heat from electronics on the go. Robert S. Irving, July, pages 56-59.

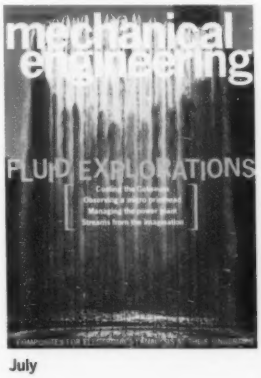
**Preaching to the Converted** A sylvan source—200 tons of wood a day—is helping to fuel a Green Mountain gasifier. Michael Valenti, December, pages 59-61.

**Printing in Three Dimensions** Office printers that produce designs rapidly as solid objects reduce the time from thought to reality. Jean Thilmany, May, pages 58-61.

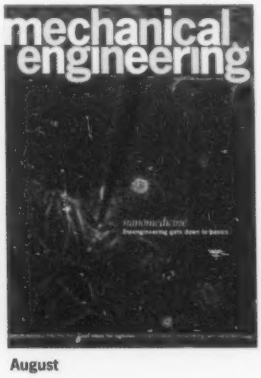
**Probing for Flaws** NASA Langley is manipulating carbon nanotubes to test for weaknesses in advanced aircraft materials. John DeGaspari, October, page 73.

**Prospecting Paydirt** Researchers are using nanoparticles of clay to raise polymers to new capabilities. John DeGaspari, April, pages 52-54.

**Pushing Productivity** Computer technology has a hand in cutting costs and raising profits. Jean Thilmany, December, pages 48-50.



July



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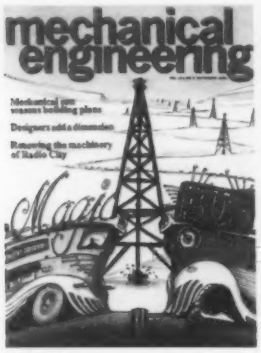


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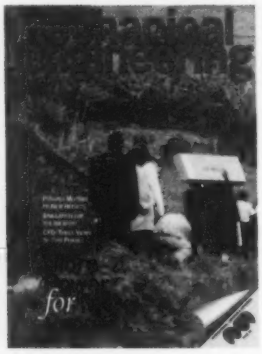


October

**Rapid Transit to Manufacturing** From metered drug delivery to implants and industrial filters, 3-D printers are taking finished goods off the rapid prototyper at production-scale rates. Paul Sharke, March, pages 63-65.

**Reactor Backers** Nuclear proposals are drawing advocates from both parties in Congress. Harry Hutchinson, August, page 70.

**Relay Races** MEMS promises relief to designers seeking a smaller electromechanical option. Peggy Chalmers, January, pages 66-68.

**Rethinking Lithium** A national laboratory proposes a solid-electrolyte version of a rechargeable battery. John DeGaspari, June, pages 86-87.

**Role Models Needed** Programs, some formal and others in the field, seek to convince more women to follow the calling of technology. Barbara Wolcott, April, pages 46-51.

**Rolling Stock** A new friction management system is intended to boost efficiency on the railroad. John DeGaspari, February, page 59.

**Saving Ears or Fuel** Whether it's peace of mind or productivity, companies say there's a big payoff in fine-tuning the friction on top of railroad tracks. John DeGaspari, September, pages 64-67.

**Shake, Rattle, and Roll** Thanks to the airbag, MEMS accelerometers are getting to explore new territory. John DeGaspari, November, pages 56-58.

**Small Packages** Reducing energy systems to the mesoscopic scale may one day yield fuel reformers for electric cars, 20 times the portable energy of batteries, or perhaps a visit to Mars. Richard B. Peterson, June, pages 58-61.

**Smarter Factories** The experts are trying to leverage information technology to turn out products not only faster and cheaper, but better, too. Harry Hutchinson, March, pages 60-62.

**Solar Gains** Photovoltaic technology is growing more popular as a means of distributed generation and as a source of power for the unwired world. Barbara Wolcott, October, pages 66-69.

**Sole Mates** Based on tests of a high-molecular weight PVC, a manufacturer predicts that it has a step up on the competition. John DeGaspari, May, page 61.

**Space Cadets** Microgravity experiments seek to test the equations for predicting flame behavior. In other words: How does a fire burn during an adventure? Harry Hutchinson, May, pages 62-68.

**Speaking Different Languages** Exchanging designs between CAD programs has never been easy and is often laborious. Jean Thilmany, February, pages 53-55.

**Standard Measure** There is one metric system, based on seven units and, yes, it is entirely consistent. Stan Jakuba, April, pages 70-72.

**Stealth on the Water** The Swedish Navy's *Visby* corvette is designed to be virtually invisible in pursuit of hostile submarines and underwater mines. Michael Valenti, January, pages 56-61.

**Stretching Dollars** Georgia Tech researchers have developed technologies to lower maintenance costs for the Navy and to automate more tasks at the factory. Michael Valenti, June, pages 80-84.

**Sun Machines** By duplicating the sun's trace through the sky or its dispersion among clouds, sky simulators help architecture harmonize with the four seasons. Paul Sharke, September, pages 46-50.

**Support on Demand** A battery of CNC machines spins out surgical implants on a just-in-time schedule. Mechanical Engineering Staff, August, pages 60-62.

**The Cold Reality of Power** Advances in cryogenic refrigeration are spurring superconductivity applications. John R. Hull and Patrick E. Phelan, June, pages 54-57.

**The Engineered Course of Treatment** Use of nanoscale devices is helping to revolutionize medical treatment and research. Mauro Ferrari and Jun Liu, December, pages 44-47.

**The Healing Hand** Engineers are making unique contributions behind the headlines of the World Trade Center disaster. Mechanical Engineering Staff. November, pages 68-72.

**The Language of Interaction** Long before "mechatronics" was coined, there were bond graphs. Today, they keep tabs on the energy in systems of every kind. Dean Karnopp and Donald Margolis, January, pages 48-50.

**The Legacy of the Cutaway Man** Russell Porter, artist, explorer, engineer, turned his hobby into an observatory of unprecedented scale in California. Frank Wicks, April, pages 56-61.

**Three Out of Two** Three-dimensional CAD may be the norm for bigger players, but now smaller shops can get in on solid modeling. Jean Thilmany, September, pages 60-63.

**Tiny, Tuned, and Unattached** Work is under way to create high-end integrated microsystems that can sense, crunch

data, and communicate wirelessly—in a package the size of a sugar cube. John DeGaspari, July, pages 50-54.

**To Catch One's Breath** A manufacturer joins forces with a product design firm to create a respiratory care device. Christopher Zirps, September, pages 68-69.

**Two Phases, Three Runs** Recalculating a job allows for the comparison of multiphase analysis methods. John Krawczyk, October, pages 74-75.

**Weld Domination** Factories and machine shops use automated controls, sensors, and continuous electric arcs to make faster welds better. Michael Valenti, April, pages 66-68.

**Wet Work** At a water purification plant, fine-tuning the process can come down to a matter of meters. Mechanical Engineering Staff, May, pages 70-72.

**Within a Nanometer of Your Life** Advances in semiconductor manufacturing techniques are bringing medicine closer to cures and treatments that have eluded researchers working on the macro scale. Allen J. Menzes et al., August, pages 54-58.

## *Mechanical Engineering Design (March)*

**Articles by Author**

**Averill, Ron, et al.**
**How Well Can It Take a Hit?** An advanced automated optimization technique can help designers develop crashworthy structures. Pages 26-28.

**Baumgartner, Henry**
**Pop That Nuke** Experimenters are testing models of nuclear reactor pressure vessels to learn what the real thing can take. Pages 16-20.

**Curry, Tom**
**Muting the Racket** A hybrid simulation approach combines real-world test data of physical parts with dynamic analysis of the mechanical system. Pages 42-45.

**Decker, Mark**
**Streamlining Product Creation** Software developments aim to reduce the design cycle and improve product quality. Pages 55-56.

**Hales, Crispin**
**Critical Factors in Design** Watching the vulnerable points in the development process can help designers sidestep costly errors. Pages 36-38.

**Mechanical Engineering Design Staff**
**Input/Output** Not Like Pulling Teeth. Page 60.

**Miller, Ed**
**Trends in Collaborative Development** New products for e-business are enabling companies to put more information through their computers. Pages 49-52.

**Musalem, Francois-Xavier**
**MEMS-Based RF Switches** Mechanical design plays a crucial role in the integration of MEMS devices used in electronic systems. Pages 22-25.

**Niazy, Abdel-Salem M.**
**The Best Shape in the Least Time** Improvements in design software have made shape optimization easier to incorporate into the design process. Pages 53-54.

**Paulsen, W. Charles**
**CAx Software Realities** So what's standing in the way of an open, interoperable world of software? Pages 32-34.

**Rodriguez, Al**
**Vessel Practices for the Process Industry** A consortium of 37 process industry owner and contractor companies is developing standards for vessel design practices. Pages 46-48.

**Tien, C.L.**
**Professionally Speaking** Research and Development in the New Millennium. Page 12.

**Yedidiah, Sam**
**Science, Experience, and Common Sense** It takes much more than correctly solving the right equations to arrive at a successful design. Pages 40-41.

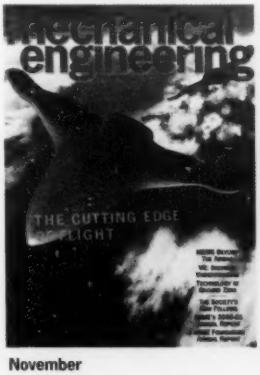
## *Mechanical Engineering Power (June)*

**Articles by Author**

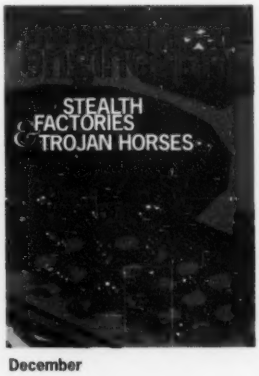
**Baumgartner, Henry**
**Sun Shower** Solar energy is providing a way to reach clean water in remote areas far from electric grids. Pages 30-34.

**Easton, Peter**
**Input/Output** Birds on a Wire. Page 44.

**Langston, Lee S.**
**Good Times With a Double Edge** In a record year for the gas turbine industry, plenty brings problems of its own. Pages 14-17.



November



December

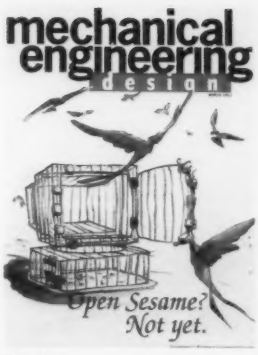
**Parker, John R.**
**Commentary** On America's Energy Crisis. Pages 2-3.

**Sharke, Paul**
**The Fifth Harmonic** Since the 20th century dawned, three-phase induction motors have been the standard. But that may be too long. Pages 35-37.

**Thilmany, Jean**
**Bigger and Better** Easy-to-use software helps wrest cost savings from large-boiler installations. Pages 38-40.

**Valenti, Michael**
**Looking Up and Looking Down** New technologies help utilities inspect power lines overhead and underground. Pages 18-25.

**Willey, Lawrence D.**
**Electricity to Rely On** The complex global scene demands multilevel, systems-based stage management. Pages 10-13.



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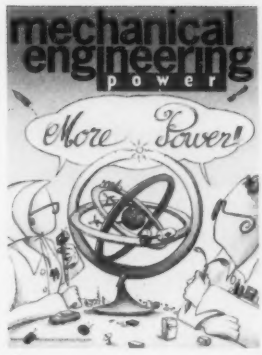

June

**Wolcott, Barbara**
**Rocket Science** A plan for a zero-emissions plant traces its roots to Jupiter and the V-2. Pages 26-29.